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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ENIN-OKUT, EDU E	
ART UNIT	**PAPER NUMBER**
1795	
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10/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/558,169	BASCHEK ET AL.	
	Examiner	Art Unit	
	Edu E. Enin-Okut	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) *1-11,14,15 and 17-19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12,13,16 and 20-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FUEL CELL AND HEATING DEVICE OF A FUEL CELL

Detailed Action

1. The amendments filed on August 13, 2009 were received. Applicant has amended claims 12, 28, 29 and 30; and, cancelled claim 19. Claims 12, 13, 16 and 20-30 are now pending.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. Claim 12, 13 and 20-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 12, 28, 29 and 30 recite "... a plurality of *generally* straight and parallel ribs ..." (emphasis added). The use of the term "generally" makes it unclear how straight the and parallel the ribs recited in the claim actually are. Further, these claims also recite "rib shaped embossing" while reciting "the ribs on one plate and the embossing on one plate". In light of the recitation, "rib shaped embossing", it is unclear how "ribs" are separate from "embossings".

Claim Rejections - 35 USC § 102

7. The rejection of claims 12, 13, 16, 22, 23 and 28 under 35 U.S.C. 102(e) as being anticipated by Suzuki et al. (US 7,195,837) is withdrawn because claims 12 and 28 were amended.

Claim Rejections - 35 USC § 103

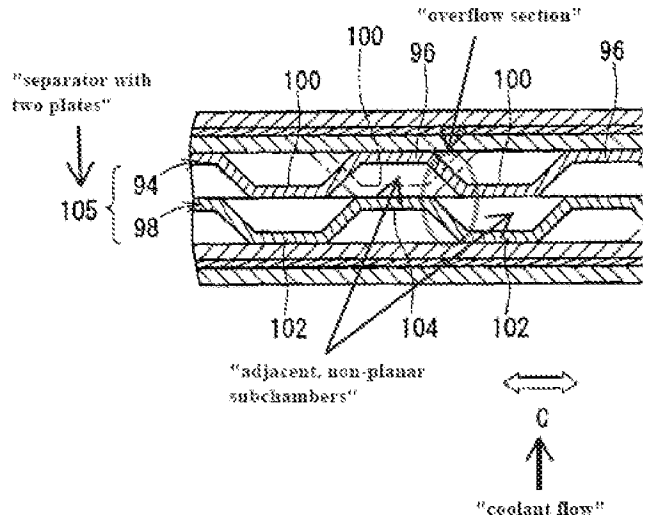
8. The rejections of claim 19, 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. in view of Enami (JP 10-308227) and Yasuo et al. (US 2002/0187379) are withdrawn because claim 12 was amended, and claim 19 was cancelled.

9. Claims 12, 13, 16 and 22-30 are rejected under 35 U.S.C. 103(a) as being unpatentable by Suzuki et al. (US 7,195,837) in view of Enami (JP 10-308227).

Regarding claims 12, 13, 16, 22, 23 and 28, Suzuki teaches a first separator 94 of a fuel cell unit, composed of an electrolyte electrode assembly 7, and a second separator 98 of another unit cell disposed adjacent to each other in a stacked assembly 90 (Abstract; 1:19-25, 10:53-65; Claim 1; Figs. 5, 6, 7). The separators 94,98, jointly making up a separator unit 105, have first and second hollow ridges 100,104 with straight and bent sections (Abstract; 10:67-11:8; Figs. 6, 7). The second hollow ridges 104 are out of phase with the first hollow ridges 100, i.e., are staggered with respect to ridges 100 (11:12-14). Crest surfaces of straight sections of the separators 94,98 are in contact with each other in regions where they cross, while crest surfaces of the bent sections are spaced apart from one another (11:14-19). The spaced crest surfaces allow separators' troughs 96,102 to communicate with each other, providing communication passages 72 between the first and second separators 94,98 (Abstract; 11:19-24). Cooling water is passed through the communication passages 72 (Abstract; 11:19-24). Fuel gas and oxygen-containing gas flow through the hollow ridges of the separators (3:28-35, 5:61-64; Figs. 6, 7). (See labeled figure from Suzuki below.)

Suzuki, Fig. 6:

FIG. 6



Suzuki does not expressly teach that the plates have ribs are generally straight and parallel with an axis of symmetry on one plate offset relative to those on the other plate. However, as to the ribs are generally straight and parallel, since such a modification would have involved a mere change in the shape of a component, it would have been an obvious matter of design choice to because Suzuki teaches that the plates' ridges are not limited to any shapes insofar as they are shaped to allow their troughs that communicate with each other to provide communication passages (see Suzuki, 4:1-4),\ and a change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). See MPEP 2144.04 (IV).

Further, as to the ribs on one plate having an axis of symmetry offset relative to that on the other plate, Enami teaches the creation of coolant flow passages between using adjacent separators 1,2 with projecting parts which are ribbed-shaped, and the separators are disposed upon each other in manner where their primary axes offset, as shown in Figs. 1, 4 (Abstract; Figs. 1, 4). Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to rotate ribs of the plates of Suzuki relative to one another because Enami teaches that this can facilitate the formation of coolant passages between separator plates to improve their cooling efficiency (see also Enami, Abstract); and, it has been

held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950)). See MPEP 2144.04 (VI).

Regarding claims 24-27, Suzuki does not expressly teach that the total surface area of the contact surfaces is at least 10%, but no more than 90%, of the surface area of the separator.

However, one of ordinary skill in the art would appreciate that the separators of Suzuki contacts its unit cell over an amount, or percentage, of its surface area (see Suzuki, Fig. 6). That artisan would also appreciate that the degree of contact of surface area of the separator plates affects the capacity to cool the fuel cell allowing more or less surface area of coolant to flow through. Further, Suzuki does teach that the rate at which the cooling water flows can be adjusted by selecting the shapes of the first and second hollow ridges (12:1-3).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the fuel cell of Suzuki in a manner where the total surface area of the contact surfaces is at least 10%, but no more than 90%, of the surface area of its separator to optimize the amount of contact surface which, in turn, affects the volume of coolant contacting the separator plates, depending on the amount of cooling needed by the cell.

Regarding claims 29 and 30, the structural limitations recited in this claim have been addressed above with respect to claim 12. However, Suzuki does not expressly teach that its separator unit serves as a heating device.

One of ordinary skill in the art would appreciate that the separator unit 105 of Suzuki cools unit cells of its stacked assembly 90 using the transport of heat from the higher temperature cell to the lower temperature cooling water flowing through the communicating passage 72 between separators 94,98. That artisan would also appreciate that this process can be reversed by passing a medium through that passage having a temperature higher than that of the unit cell.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the separator unit of Suzuki as a heating device for a fuel cell because it is well-known in the art to provide heat to fuel cell components to facilitate cell operations under conditions below its normal, ambient operating temperature, or to heat the cell during its start-up.

10. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. and Enami as applied to claims 12, 13, 16 and 22-30 above, and further in view of Yasuo et al. (US 2002/0187379).

Suzuki is applied and incorporated herein for the reasons above.

Regarding claims 20 and 21, Suzuki does not expressly teach that the contact surfaces are gold-plated.

Yasuo teaches separator for a fuel cell a where the surface of the separator is plated with a precious metal, such as gold, platinum, or nickel, that has high corrosion resistance and high conductivity (Abstract; para. 9). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to plate the contact surfaces of Suzuki with gold because Yasuo teaches that the plating can impart those areas with corrosion resistance and high conductivity.

Response to Arguments

11. In sum, Applicant makes the following arguments in its remarks filed on August 13, 2009:

> (a) "Suzuki does not disclose that the embossings on each plate are generally straight and parallel ribs." (see p. 6)
>
> (b) "Applicants note that Enami teaches straight cooling channels, and the channels on each plate are disposed perpendicular relative to one another. However, Enami does not include the subchambers, let alone an overflow section; therefore, Enami cannot provide essential elements of Applicants' claimed invention. Moreover, one skilled in the art would not rotate the embossings of the plates of Suzuki because such a combination may render Suzuki inoperable." (see p. 7)

12. As to applicant's argument (a) above, Applicant is direct to the rejection of claim 12, as amended, presented above (see Paragraph 9).

13. As to applicant's argument (b) above, it should be noted that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In this case, the Enami reference is applied to teach the concept of offsetting the ribs on adjacent separator plates to create coolant channels in fuel cell with an improved cooling efficiency (see Enami, Abstract). Enami also teaches the ribs at an offset other than perpendicular, as shown in Fig. 4. One of ordinary skill in the art would readily appreciate that Fig. 4 of Enami is similar to applicant's representation of ribbed, offset plates as shown in Fig. 4 of the instant specification. Further, that artisan would also appreciate that, depending upon where a cross-sectional view of Fig. 4 of Enami is taken, it can produce an image similar to that shown in Fig. 2 of applicant's instant specification.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action

is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075**. The examiner can normally be reached on Monday to Thursday, 7 a.m. - 3 p.m. (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan, can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E. Enin-Okut/
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795